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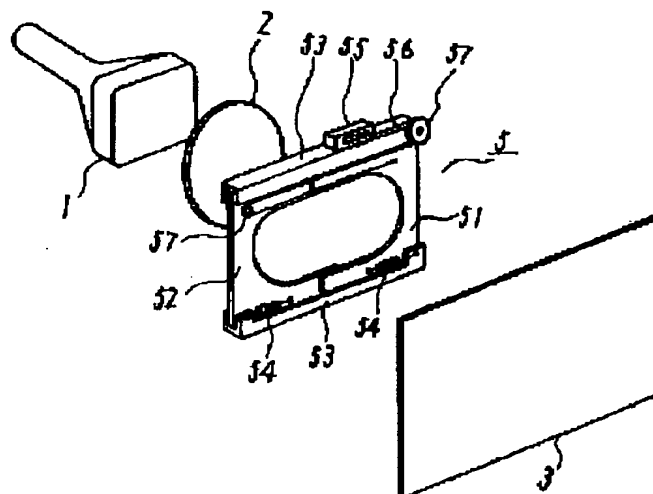
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APPLICANT : MITSUBISHI ELECTRIC CORP;

INVENTOR : SASAKI HIROSHI;

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TITLE : PROJECTOR DEVICE



ABSTRACT : **PURPOSE:** To shield video light on the peripheral part of the display surface of a displaying body generating the video light, which includes much flare light, and to improve the resolution of a picture on a screen by providing a light shielding plate whose shape at a light passing part is changed in accordance with the external shape of the display surface of the displaying body.

CONSTITUTION: When the picture whose aspect ratio is 16:9 is displayed on a CRT, output from a screen size discriminating device is low and input to a relay connected through an amplifier is low, so that voltage is not supplied to a solenoid 55. The movable part of the solenoid 55 is on the light shielding plate A51 side, and the area of the apertures of the light shielding plates A51 and B52 is made larger by a coil spring 54. When the picture on the CRT is switched to the picture whose aspect ratio is 4:3, the output from the screen size discriminating device becomes high and the power is supplied to the solenoid 55. The movable part of the solenoid 55 is moved to the light shielding plate B52 side and the light shielding plates A51 and B52 are moved by a traction fiber 56 guided by a pulley 57 in a direction where the area of the apertures becomes smaller.

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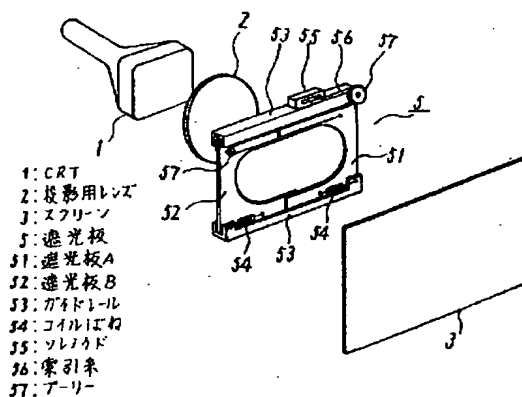
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(54) 【発明の名称】 プロジェクタ装置

(57) 【要約】

【目的】 映像光を発生する表示体に表示する表示面全体の外形の形状の変化に対応して、スクリーン上に要求される輝度条件を満たす範囲内で、画像の解像度を向上する遮光板を備えたプロジェクタ装置を得る。

【構成】 C R T 1 からレンズ2を介してスクリーン3に画像が投射されるが、この画像の周辺部の投射光の一部を遮光板5によって遮光する。遮光板5はC R T 1 上の画像のアスペクト比に対応して、その開口アスペクト比を変更するように制御されている。



装置、56はソレノイド55と遮光板A51とを結ぶ牽引糸、57は牽引糸56をガイドするプーリーである。図2はソレノイド55を制御する回路図で、図において6は画面サイズ識別器、7は画面サイズ識別器6の出力信号を増幅する増幅器、8はソレノイド55を制御するリレーである。図3は遮光板5によるCRT1からの映像光の遮光の様子を示したもので、9はCRT1の蛍光面を示し、10は遮光板5によって制限される蛍光面9からの映像光の光路である。

【0013】次に原理について説明する。図3においてCRTの蛍光面9から発する映像光はレンズ2で収束され遮光板5で制限されてスクリーン3上に投射される。CRTの蛍光面9上にaで示されるサイズの画像が表示されている場合は、可変遮光板5の遮光部がcより中心軸側に伸びるとスクリーン3上の画像の周辺の明るさが低下して要求される値を満たさなくなるとすると、遮光板5はcで示される領域より内側に伸ばすことはできない。ところがCRT上に表示される画像が切り換わって領域bで示されるサイズの画像になった場合は遮光板5は領域dで示される範囲まで遮光してもスクリーン上に投射される画像の明るさの低下をもたらすことはない。

【0014】次に動作について説明する。画像の横、縦の長さの比（以下アスペクト比と称す）が16:9の画像を、垂直巾がこれと同じでアスペクト比4:3の画像に切り換えた場合、すなわち画像サイズが平行方向にのみ縮小された場合を例にとる。CRTにアスペクト比16:9の画像が表示されている時、図2において画面サイズ識別器6の出力はLowで、増幅器7を介して接続されるリレー8の入力はLowとなり、ソレノイド55へは電圧が供給されない。このとき図1に示すようにソレノイド55の可動部は遮光板A51側の位置にあり、遮光板A51及び遮光板B52はコイルばね54により開口部面積が大きくなる位置関係にある。次にCRT上の画像がアスペクト比4:3の画像に切り換わると画面サイズ識別器6の出力はHighとなり、増幅器7を介してリレー8の入力もHighとなりソレノイド55へ電圧が供給される。このときソレノイド55の可動部は遮光板B52側の位置に移動し、その動きはプーリー57にガイドされる牽引糸56によって遮光板A51と遮光板B52とに伝えられ、遮光板A51と遮光板B52はその開口部面積が小さくなる位置関係に移動する。CRT上の画像が再度16:9になりソレノイド55の可動片が遮光板A51側の位置に戻ったときには、遮光板A51と遮光板B52はコイルばね54によって加えられている力により開口部面積が大きくなる方向に移動する。

【0015】実施例2。以下にこの発明の他の実施例について述べる。実施例1において遮光板5はスライド方式によるものを示したが、図4に示すように回転式の遮光板を使用しても良く、同様の効果を得ることができ

る。図4、図5、図6において11は中央に楕円形の開口部を持ち、外周部に歯が刻まれた歯車部になっている遮光板C、12は中央に楕円形の開口部を持ち、周辺部13が遮光板C11を抱え込んで保持する構造となっている遮光板D、14は遮光板C11の歯車部と噛み合うように配置されたギア、15はギア14を駆動するステッピングモータである。図7にこのステッピングモータ15を制御する回路を示す。6は画面サイズ識別器、16はステッピングモータ15を駆動するパルス発生器、17は上記パルス発生器16を制御するカウンタである。

【0016】次に動作について述べる。画像のサイズが4:3のアスペクト比の画像を垂直巾がこれと同じでアスペクト比16:9の画像に切り換えた場合、すなわち画像サイズが平行方向にのみ大きくなった場合を例にとる。画面サイズ識別器6の信号出力はLowとなりその信号を受けたパルス発生器16はたとえばステッピングモータ15を正方向に回転させるパルスが発生する。

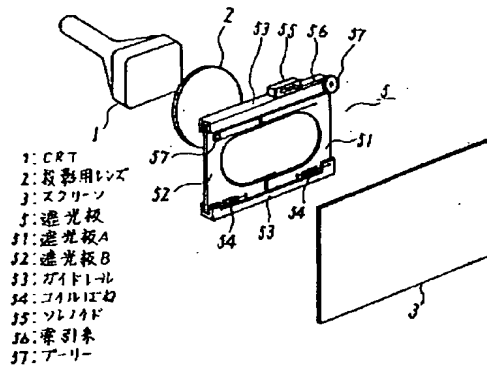
4:3の画面時にその楕円形開口部の直径方向が互いに90度の角度を持つ位置関係にあった遮光板C11と遮光板D12は、ステッピングモータ15により互いの長径方向が重なる方向に回転する。そして互いの長径が同じ向きになった時に回転軸が90度回転したら停止信号を発生するように設定されたカウンタ17によりパルスの発生が止まり、回転が停止し、開口部面積は大きくなる。また、CRTの画像を16:9から4:3に切り換えた場合には、画面サイズ識別器の出力信号はHighとなり、その信号を受けたパルス発生器16はステッピングモータ15を逆方向に回転させるパルスが発生する。ステッピングモータ15が逆方向に90度回転するとカウンタ17の停止信号によりパルス発生器のパルスが止まり、遮光板C11と遮光板D12はその楕円開口部の長径が互いに90度になった位置関係に戻り、開口部面積は小さくなる。

【0017】実施例3。上記実施例1および実施例2において遮光板5はレンズ2とスクリーン3の間に配置したが、レンズ2とCRT1との間に配置しても良く、同様の効果を得る。

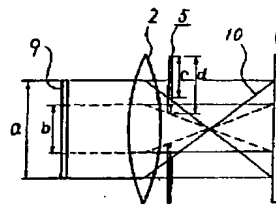
【0018】実施例4。上記実施例1～3において遮光板5はレンズの前または後ろに配置したが、通常レンズは複数のレンズ群から構成されているので図8に示すようにレンズとレンズの間に遮光板を配置しても良く、同様の効果を得る。図において18、19、20はレンズでありCRT1からの投射光をスクリーン3に収束する。また21はレンズ群と例えば実施例2で示した遮光板C11、遮光板D12を保持するレンズ筒である。

【0019】実施例5。上記実施例1において画面サイズ識別器6はCRT上の画像のアスペクト比によって出力信号を変化したが、画像のアスペクト比は一定ながらその映像信号の外周部がブランキング信号で構成され、

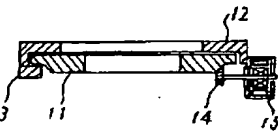
【図1】



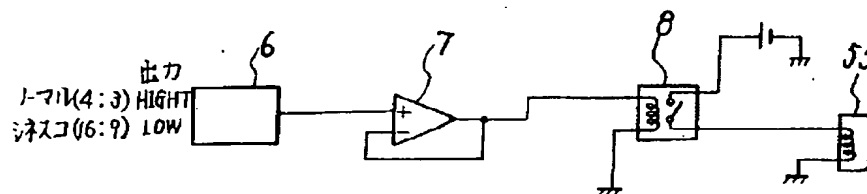
【図3】



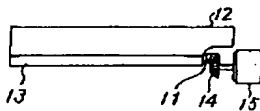
【図4】



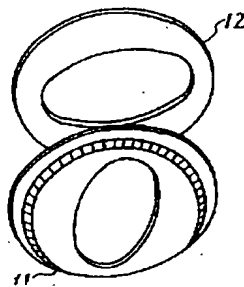
【図2】



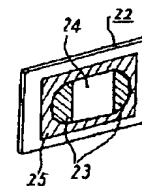
【図5】



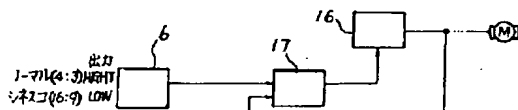
【図6】



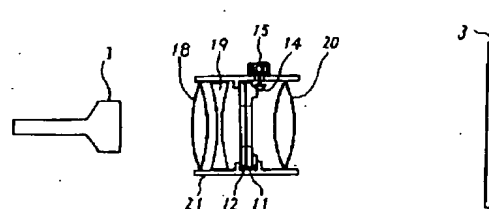
【図9】



【図7】



【図8】



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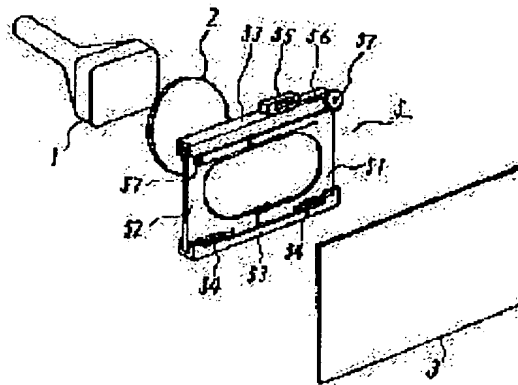
(72)Inventor : SASAKI HIROSHI

(54) PROJECTOR DEVICE

(57)Abstract:

PURPOSE: To shield video light on the peripheral part of the display surface of a displaying body generating the video light, which includes much flare light, and to improve the resolution of a picture on a screen by providing a light shielding plate whose shape at a light passing part is changed in accordance with the external shape of the display surface of the displaying body.

CONSTITUTION: When the picture whose aspect ratio is 16:9 is displayed on a CRT, output from a screen size discriminating device is low and input to a relay connected through an amplifier is low, so that voltage is not supplied to a solenoid 55. The movable part of the solenoid 55 is on the light shielding plate A51 side, and the area of the apertures of the light shielding plates A51 and B52 is made larger by a coil spring 54. When the picture on the CRT is switched to the picture whose aspect ratio is 4:3, the output from the screen size discriminating device becomes high and the power is supplied to the solenoid 55. The movable part of the solenoid 55 is moved to the light shielding plate B52 side and the light shielding plates A51 and B52 are moved by a traction fiber 56 guided by a pulley 57 in a direction where the area of the apertures becomes smaller.



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CLAIMS

[Claim(s)]

[Claim 1] Projector equipment equipped with the driving means for changing the configuration of the gobo with which the configuration of the part which converges the display object which generates image light, and the image light of this display object, is arranged between the lens which carries out image formation to a screen, and the above-mentioned display object and the above-mentioned screen, and penetrates light corresponding to the appearance configuration of the screen of a display object is changed, and the light-transmission section of this gobo.

[Claim 2] A gobo is projector equipment according to claim 1 characterized by being constituted with two or more plates which move in the direction of a straight line.

[Claim 3] A gobo is projector equipment according to claim 1 characterized by consisting of two or more plates with which it has opening, respectively and at least one was constituted free [rotation].

[Claim 4] A gobo is projector equipment according to claim 1 characterized by being the liquid crystal plate with which the transparency field of light is changed by the electrical signal.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the projector equipment which uses a gobo for optical system and projects an image.

[0002]

[Description of the Prior Art] Drawing 12 is an example of the optical system of the projector equipment using the conventional gobo. In drawing, 1 is the display object which generates image light, for example, it is the gobo with which a cathode-ray tube (Following CRT is called) and 2 have a lens for projection, and, as for a screen and 4, 3 has circle configuration opening of a diameter a little smaller than a lens 2 at the core.

[0003] Next, actuation is explained. The image light generated from CRT1 is projected on a screen 3 through a lens 2. However, in the lens system of many molds, since the image projected on the circumference part of a screen 3 contains the flare light which shifted from the original optical path according to the aberration of a lens, compared with a core, resolution deteriorates remarkably. In order to improve this, the gobo 4 for interrupting the beam of light which passes the periphery of a lens 2 is arranged near the lens 2. Consequently, the incident light which reaches a screen 3 turns into only light which passed through near the core of the lens which seldom contains flare light, and the image of high resolution is obtained. Although the resolution of the image on a screen 3 becomes high so that the area of opening of a gobo 4 is small, brightness falls simultaneously. For this reason, the opening area of a gobo 4 is decided according to the brightness conditions required of the image on a screen 3.

[0004]

[Problem(s) to be Solved by the Invention] Since the optical system of conventional projector equipment consisted of gobos with which opening area was fixed as mentioned above, the protection-from-light effectiveness was optimized by only the specific appearance configuration with the screen of CRT1, when the appearance configuration of the screen of CRT1 was changed, the improvement effect of the resolution of the image on a screen 3 became imperfection, or there was a fault that required brightness conditions were no longer fulfilled. Moreover, it needed to exchange to the gobo which has opening which is adapted for each whenever it changes the appearance configuration of the screen of CRT1, in order to conquer this fault.

[0005] This invention aims at obtaining the projector equipment equipped with the gobo for improving the resolution of an image within limits which fulfill the brightness conditions demanded on a screen when the appearance configuration of the screen of the display object which was made in order to cancel the above troubles, and generates image light is switched to two or more configurations.

[0006]

[Means for Solving the Problem] In that optical system, the projector equipment concerning this invention arranges the gobo with which the configuration of the part which penetrates light is changed between a display object and a screen corresponding to the appearance configuration of the screen of the display object which generates image light, and establishes the driving means for changing the

configuration of the light transmission section of this gobo.

[0007] Moreover, the gobo is constituted by two or more plates which move in the direction of a straight line.

[0008] Moreover, a gobo has opening, respectively and consists of two or more plates with which at least one was constituted free [rotation].

[0009] Moreover, the gobo consists of liquid crystal plates which change the transparency field of light with an electrical signal.

[0010]

[Function] The configuration of the part which penetrates light corresponding to the appearance configuration of the screen of the display object which generates image light is changed mechanically, and the gobo in this invention covers the image light of the screen periphery which contains many flare light within limits which fulfill the brightness conditions demanded on a screen.

[0011] The liquid crystal gobo in this invention changes the transparency field of light with an electrical signal corresponding to the appearance configuration of the screen of the display object which generates image light, and covers the image light of the screen periphery which contains many flare light within limits which fulfill the brightness conditions demanded on a screen.

[0012]

[Example]

One example of this invention is explained about drawing below example 1. CRT in which 1 generates image light in drawing 1, the lens which converges the image light which generated 2 from this CRT1, the screen which projects the image light which converged 3 with this lens 2, and 5 are the gobos which intercept a part of image light projected on a screen 3 through a lens 2, and consist of following parts. The driving gear which generates driving force in the direction of a straight line, the traction fiber to which 56 connects a solenoid 55 and a gobo A51, and 57 are pulleys which guide a traction fiber 56 like a solenoid in the guide rail with which Gobo A and 52 support Gobo B and, as for 53, 51 supports a gobo A51 and gobo B-52 from a both-sides side, the coiled spring with which 54 had ends fixed by a guide rail 53, a gobo A51, and gobo B-52, and 55. Drawing 2 is the circuit diagram which controls a solenoid 55, and the amplifier with which 6 amplifies a screen size discrimination circuit and 7 amplifies the output signal of the screen size discrimination circuit 6 in drawing, and 8 are relays which control a solenoid 55. Drawing 3 is what showed the situation of protection from light of the image light from CRT1 by the gobo 5, 9 shows the phosphor screen of CRT1 and 10 is the optical path of the image light from the phosphor screen 9 restricted with a gobo 5.

[0013] Next, a principle is explained. It converges with a lens 2, the image light emitted from the phosphor screen 9 of CRT in drawing 3 is restricted by the gobo 5, and it is projected on it on a screen 3. When the protection-from-light section of the adjustable gobo 5 is extended from c to a medial-axis side, supposing it stops fulfilling the value as which the surrounding brightness of the image on a screen 3 is required by falling when the image of the size shown by a is displayed on the phosphor screen 9 of CRT, a gobo 5 cannot be lengthened inside the field shown by c. However, when it becomes the image of the size which the image displayed on CRT switches and is shown in Field b, a gobo 5 does not bring about lowering of the brightness of the image on which it is projected on a screen, even if it shades to the range shown in Field d.

[0014] Next, actuation is explained. When the vertical width of the ratio (an aspect ratio is called below) of the side of an image and the vertical die length is the same as this and it switches the image of 16:9 to the image of an aspect ratio 4:3, the case where the chisel cutback of the image size is carried out in parallel is taken for an example. When the image of an aspect ratio 16:9 is displayed on CRT, in drawing 2, the output of the screen size discrimination circuit 6 is Low, the input of the relay 8 connected through amplifier 7 serves as Low, and an electrical potential difference is not supplied to a solenoid 55. As shown in drawing 1 at this time, the moving part of a solenoid 55 is located in the location by the side of a gobo A51, and a gobo A51 and gobo B-52 are in the physical relationship to which opening area becomes large with coiled spring 54. Next, if the image on CRT switches to the image of an aspect ratio 4:3, the output of the screen size discrimination circuit 6 will serve as High, the

input of relay 8 will also serve as High through amplifier 7, and an electrical potential difference will be supplied to a solenoid 55. At this time, the moving part of a solenoid 55 moves to the location by the side of gobo B-52, that motion is told to a gobo A51 and gobo B-52 by the traction fiber 56 guided to a pulley 57, and a gobo A51 and gobo B-52 move to the physical relationship to which that opening area becomes small. When the image on CRT is again set to 16:9 and the movable piece of a solenoid 55 returns to the location by the side of a gobo A51, a gobo A51 and gobo B-52 move in the direction in which opening area becomes large according to the force currently applied by coiled spring 54.

[0015] Other examples of this invention are stated to below example 2. Although what twists a gobo 5 to a slide method was shown in the example 1, as shown in drawing 4, the gobo of a rotating type may be used, and the same effectiveness can be acquired. The gear arranged as geared with the gearing section of a gobo C11 in the gobo D used as the structure where 11 has opening of an ellipse form in the center in drawing 4, drawing 5, and drawing 6, the gobo C which is the gearing section in which the gear tooth was minced by the periphery section, and 12 have opening of an ellipse form in the center, and a periphery 13 holds and holds a gobo C11, and 14, and 15 are stepping motors which drive a gear 14. The circuit which controls this stepping motor 15 to drawing 7 is shown. The pulse generator with which 6 drives a screen size discrimination circuit and 16 drives a stepping motor 15, and 17 are counters which control the above-mentioned pulse generator 16.

[0016] Next, actuation is described. The size of an image takes for an example the case where image size becomes large only in parallel, when vertical width is the same as this and switches the image of the aspect ratio of 4:3 to the image of an aspect ratio 16:9. The pulse to which the signal output of the screen size discrimination circuit 6 serves as Low, and the carrier beam pulse generator 16 rotates a stepping motor 15 in the forward direction for the signal is generated. The gobo C11 which suited the physical relationship in which the diameter direction of the ellipse form opening has the include angle of 90 degrees mutually at the time of the screen of 4:3, and a gobo D12 rotate in the direction with which the mutual major-axis direction laps with a stepping motor 15. And if a revolving shaft rotates 90 degrees when a mutual major axis becomes the same direction, generating of a pulse will stop with the counter 17 set up so that a stop signal might be generated, a revolution stops, and opening area becomes large. Moreover, when the image of CRT is switched to 4:3 from 16:9, the output signal of a screen size discrimination circuit serves as High, and the pulse to which the carrier beam pulse generator 16 makes hard flow rotate a stepping motor 15 for the signal is generated. If a stepping motor 15 rotates 90 degrees to hard flow, the pulse of a pulse generator will stop with the stop signal of a counter 17, and in a gobo C11 and a gobo D12, return and opening area become small at the physical relationship from which the major axis of the ellipse opening became 90 degrees mutually.

[0017] Although the gobo 5 has been arranged between a lens 2 and a screen 3 in the example 3. above-mentioned example 1 and an example 2, you may arrange between a lens 2 and CRT1, and the same effectiveness is acquired.

[0018] Although the gobo 5 has been arranged before a lens or to back in the example 4. above-mentioned examples 1-3, since the lens consists of two or more lens groups, as shown in drawing 8, it may arrange a gobo between lenses, and usually acquires the same effectiveness. In drawing, 18, 19, and 20 are lenses and converge the incident light from CRT1 on a screen 3. Moreover, 21 is a lens cylinder holding a lens group, and the gobo C11 shown in the example 2 and a gobo D12.

[0019] Although the screen size discrimination circuit 6 changed the output signal with the aspect ratios of the image on CRT in the example 5. above-mentioned example 1, the aspect ratio of an image acquires the same effectiveness, also when the periphery section of the video signal consists of blanking signals with regularity, and it constitutes so that the output signal of the screen size discrimination circuit 6 may change, when image size changes substantially.

[0020] Although a gobo 5, or 11 and 12 used the components from which opening area changes with change of mechanical structure in the example 6. above-mentioned examples 1-5, a liquid crystal plate as shown in drawing 9 and drawing 10 may be used, and the same effectiveness can be acquired.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view showing the optical system of the projector equipment in which the example 1 of this invention is shown.

[Drawing 2] It is the block diagram showing the control circuit of the adjustable gobo in the example 1 of this invention.

[Drawing 3] It is the sectional view showing the optical system of the projector equipment in which the example 1 of this invention is shown.

[Drawing 4] It is the sectional view showing the adjustable gobo in the example 2 of this invention.

[Drawing 5] It is the side elevation showing the adjustable gobo in the example 2 of this invention.

[Drawing 6] It is the perspective view showing the adjustable gobo in the example 2 of this invention.

[Drawing 7] It is the block diagram showing the control circuit of the adjustable gobo in the example 2 of this invention.

[Drawing 8] It is the sectional view showing the optical system of the projector equipment in which the example 4 of this invention is shown.

[Drawing 9] It is the perspective view showing the gobo in the example 6 of this invention.

[Drawing 10] It is the front view showing the gobo in the example 6 of this invention.

[Drawing 11] It is the block diagram showing the control circuit of the gobo in the example 6 of this invention.

[Drawing 12] It is the perspective view showing the optical system of conventional projector equipment.

[Description of Notations]

- 1 Cathode Electron Tube (CRT)
- 2 Lens for Projection
- 3 Screen
- 4 Gobo (the Conventional Thing)
- 5 Gobo
- 51 Gobo A
- 52 Gobo B
- 53 Guide Rail
- 54 Coiled Spring
- 55 Solenoid
- 56 Traction Fiber
- 57 Pulley
- 6 Screen Size Discrimination Circuit
- 7 Amplifier
- 8 Relay
- 9 Phosphor Screen of Image on CRT
- 10 Optical Path

11 Gobo C
12 Gobo D
13 Periphery of Gobo D
14 Gear
15 Stepping Motor
16 Pulse Generator
17 Counter
18 Projector Lens
19 Projector Lens
20 Projector Lens
21 Lens Cylinder
22 Protection-from-Light Liquid Crystal Plate
23 Liquid Crystal Section
24 Area Pellucida
25 Non-Area Pellucida
26 Liquid Crystal Driver

[Translation done.]

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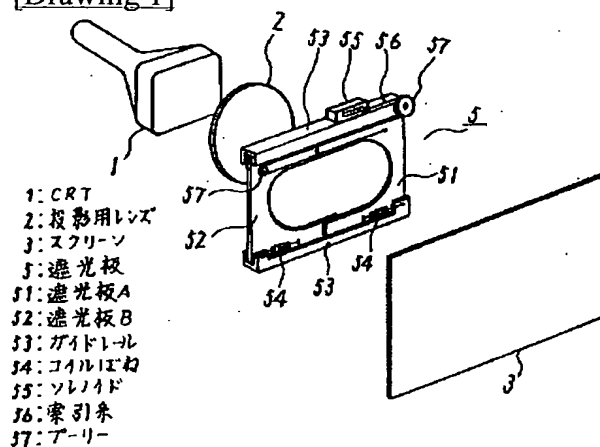
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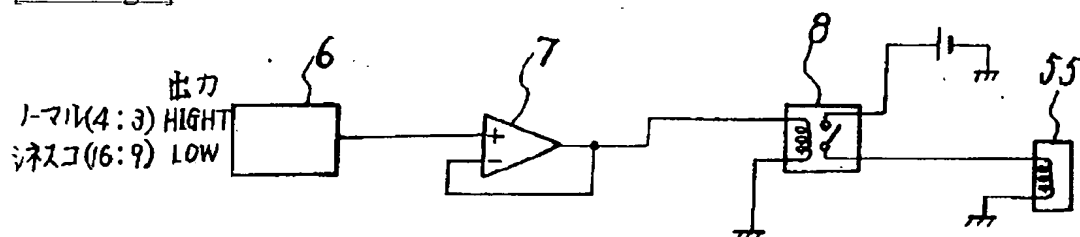
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DRAWINGS

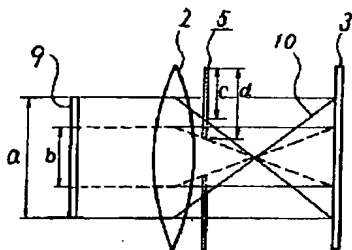
[Drawing 1]



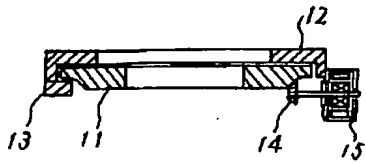
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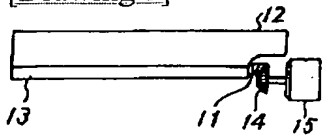
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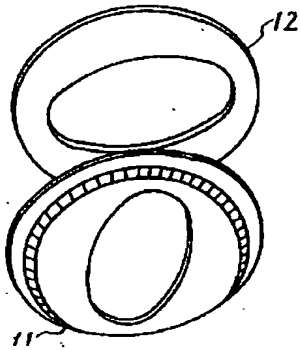
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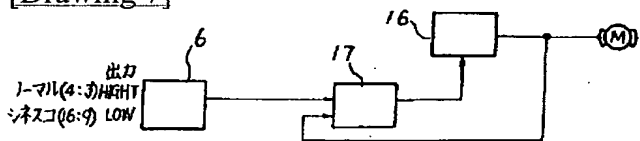
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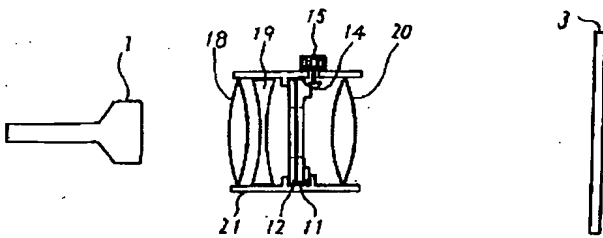
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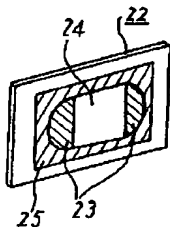
[Drawing 7]



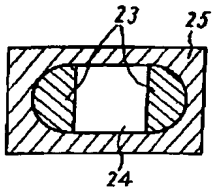
[Drawing 8]



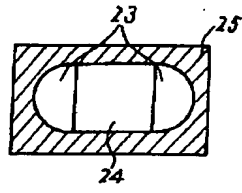
[Drawing 9]



[Drawing 10]

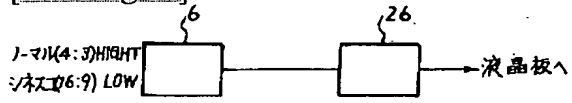


(a) 4:3 時

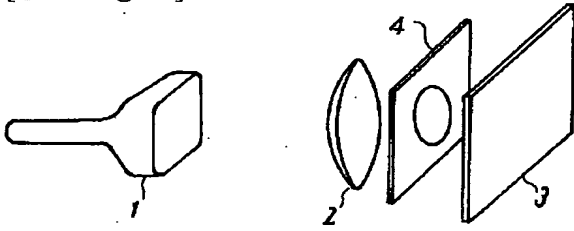


(b) 16:9 時

[Drawing 11]



[Drawing 12]



[Translation done.]